Safety in the Netherlands

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Mr Chairman, distinguished Members of the Committee, ladies and gentlemen, it is a great honor for me to testify on the subject of flood protection policy in the Netherlands.

Let me tell you something about myself. I spent my entire career in the Netherlands' Ministry of Public Works and Water management, in the department called Rijkswaterstaat. It is comparable to the U.S. Army Corps of Engineers. From 1981 till 1997 I was in charge of policymaking on flood protection.

As you know, Mr Chairman, I have submitted my paper, called "Flood Defense in the Netherlands – Lessons Learned from Dutch History." I respectfully request that this paper be inserted in the Record of your Committee.

First of all I need to point out that the water situation in the Netherlands is quite different from the United States. It is a fact that almost 60 percent of our country is threatened by water: either by storm surges, and/or by floods due to high discharges of rivers. We earn 70 percent of our Gross National Product in these flood prone areas. Millions of people live below sea level. Cities such as Rotterdam (our main harbor), Amsterdam (our capital), and our largest international airport are below sea level. That is why in the Netherlands dedicated organizations were established in the past with the sole purpose to defend the country against flooding from the sea and rivers. On a local (or county) level these are called the Water Boards, and on the national (or federal) level it is my organization, Rijkswaterstaat.

My main message to your Committee, Mr Chairman, is that we have learned – and continue to learn – from history, especially the history of flood disasters. Each flood disaster in the Netherlands – from the 13th century onwards – has brought us new lessons to be learned for keeping our country habitable.

After the disaster of 1953, in which nearly 2,000 people died, we designed our Deltaplan, primarily meant for the coastal areas. In this Deltaplan for the first time we developed a comprehensive system of standards for designing dikes and barriers for the whole country. These government-endorsed standards assure the quality of our water defense system. All our dikes were rebuilt accordingly, and the total length of our coastline was shortened by more than 700 kilometers as the result of closing estuaries with dams or storm surge barriers.

It took half a century to implement this plan. It is important to notice that in the 1970's new insights were gained about morphological as well as ecological processes.
For these reasons the last two barriers, constructed at the end of the Deltaplan, are partly open and movable:

- the Easternscheldt Barrier because of the fishery, sedimentation, and the environment;
- the Stormsurge Barrier in the Rotterdam Waterway because of shipping and sedimentation.

These barriers are only closed in case of storm surges to keep out the water. During half a century, we have invested about 15 billion in today's US dollars in our Deltaplan.

In 1993 and 1995 in the river areas, the extreme discharges of the major rivers nearly overtopped the dikes. 250,000 people and their livestock were evacuated. That event made clear again that we could not postpone upgrading the river dikes. But what we have learned (in that period) too is that a water defense system includes not only technical solutions. It is not just building and maintaining dikes. Disasters can always happen, and therefore you need evacuation plans.
In addition, it is always advisable to think about zoning, that is to say legislating the areas to be reserved for urban development and for water. Our government designed this new policy in a document called "More Room for Water", in which our "Spatial Planning Act" plays a pivotal role.

Now, if you were to ask me what are the most important elements of our protection-policy, I would say the following:

- knowhow & organizational structure
- standards & legislation
- priorities & budget
- prevention & zoning

As to *knowhow*, it clearly includes technology, morphological and ecological knowledge, statistics and predictions. New developments such as sea level rise and climate change are important components. To safeguard that the development of this knowledge stays on the highest level, we have and need a department such as mine, working on the national level, as a respected partner in the international exchange of knowledge. My department, Rijkswaterstaat, by the way, has been around since 1798.

On the *local* level, we have – for 800 years – one-issue organizations, called "Water Boards" whose only task is water management, which includes flood protection. Water Boards are public administrations with their own election and tax system.

Now I come to standards and legislation.
Our *standards* are accepted risks related to the design-criteria of our dikes. Those standards are laid down in the "Flood Defense Act".

- For the economically most important and densely populated part of the country, we design our dikes and dunes to be strong enough to withstand a storm-situation with a probability of 1 to 10,000 a year! That means, that a Dutchman – if he should live a 100 years – has a chance of 1 percent to witness such an event. For our parliament, these odds became the acceptable standard.
- For the less important coastal areas we calculate the probability of 1 to 4,000, and
- along the main rivers 1 to 1,250.

Every five years, the entire defense system is checked for compliancy with the standards by assessments from the local Water Boards. A summary of these assessments is submitted to the national parliament. In order to be able to make these assessments, it is essential to know what the hydraulic specifications, belonging to the political standards, are. My department, Rijkswaterstaat, publishes these hydraulic specifications, in which we implement the latest knowledge of statistics, failure mechanisms of dikes, sea level rise and climate change.

A few words about priorities and budget.
Since 1953, financing of renovating the dikes has been a *national priority*. All funds for rebuilding are allocated by the central government. Maintenance – financially and operationally – is totally controlled by the Water Boards, who in turn, tax the local population. Since the Water Boards have no other responsibility than water, this implicitly means that other priorities never go to the detriment of the water defense system.

And finally I get to the matter of prevention and zoning.
The notion of *zoning* is fairly new in our approach. We need to answer questions such as whether we reserve space for urban developments or whether we dedicate space exclusively for water.
Last but not least it is important to realize that total safety does not exist and therefore it is essential to *be prepared*, for instance by having evacuation plans. After all, Members of the Committee, disasters do happen.

Thank you, Mr Chairman.